

Service Manual

**CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS**



**ORDER NO.
ARP-649-0**

STEREO AMPLIFIER

A-X700

MODEL A-X700 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

| Type | Voltage | Remarks |
|------|---------------------------------------|--------------------------|
| KU | AC120V only | U.S.A. model |
| HE | AC220V, 240V (switchable) | European continent model |
| HB | AC220V, 240V (switchable) | United Kingdom model |
| S | AC110V, 120V, 220V, 240V (switchable) | General export model |
| S/G | AC110V, 120V, 220V, 240V (switchable) | U.S. Military model |

- This service manual is applicable to the KU, HE, HB and S, S/G types.
For servicing of the HE, HB, S, S/G types, please refer to Pages 30~44.

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1. SPECIFICATIONS

Amplifier Section

Continuous average power output is 45 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.07% total harmonic distortion.

DIN, Continuous Power Output at 1 kHz (both channels driven)

T.H.D. 1%, 8 Ω 50 W per channel

Input (Sensitivity/Impedance)

PHONO 2.5 mV/50 k Ω

TUNER, CD, TAPE PLAY, VIDEO/AUX

ADAPTOR 150 mV/50 k Ω

Phono Overload Level (T.H.D. 0.1%, 1 kHz)

..... 75 mV

Output (Level/Impedance)

TAPE REC 150 mV/2.2 k Ω

Frequency Response

PHONO (RIAA Equalization)

..... 20 Hz to 20 kHz \pm 0.3 dB

TUNER, CD, VIDEO/AUX, TAPE PLAY,

ADAPTOR 20 Hz to 20 kHz \pm 2 dB

Tone Control

BASS \pm 10 dB (100 Hz)

TREBLE \pm 10 dB (10 kHz)

Muting -20 dB

Loudness Control (Volume control set at -40 dB position)

100 Hz +7 dB

10 kHz +4 dB

Hum and Noise (IHF, short circuited, A network)

PHONO 80 dB

CD, VIDEO/AUX, ADAPTOR, TUNER,

TAPE PLAY 97 dB

Hum and Noise (DIN, continuous power 150 mW)

PHONO 73 dB/66 dB

CD, VIDEO/AUX, ADAPTOR, TUNER,

TAPE PLAY 85 dB/62 dB

Miscellaneous

Power Requirements

HE model a.c. 220 V \sim , 50/60 Hz

HB model a.c. 240 V \sim , 50/60 Hz

S, S/G models' \sim AC 110 V/120 V/220 V/240 V
(switchable), 50/60 Hz

KU model AC 120 V, 60 Hz

Power Consumption

HE model 310 W

HB model 310 W

S, S/G models 140 W

KU model 140 W

Dimensions 320 (W) x 98 (H) x 221 (D) mm

12-5/8 (W) x 3-7/8 (H) x 8-3/4 (D) in

Weight (without package) 5.2 kg (11 lb 7 oz)

Furnished Parts

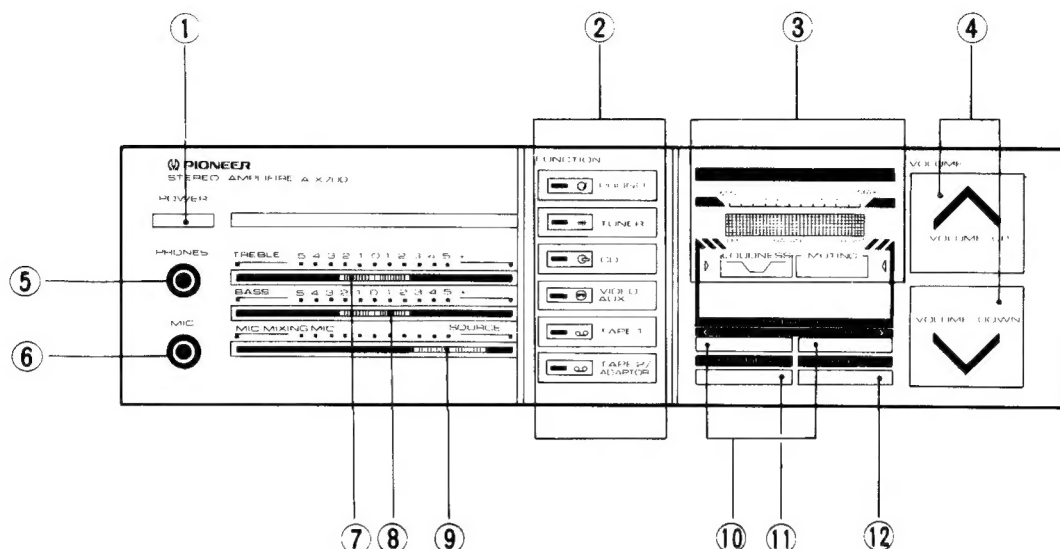
Operating Instructions 1

NOTE:

- Specifications and design subject to possible modification without notice due to improvements.
- *Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Claims for Amplifier.

2. FRONT PANEL FACILITIES

FRONT PANEL



① POWER switch

Press to turn power to the unit ON and OFF.
Depressed position (ON):
Power is supplied to the unit.
Released position (OFF):
Power to the unit is disconnected.

② FUNCTION switches/indicators

[PHONO] — Press when listening to record playback on a turntable.
[TUNER] — Press when listening to AM or FM broadcasts with a tuner.
[CD] — Press when listening to a compact disc playback with a CD player.
[VIDEO/AUX] — Press when listening to programs from a component connected to the VIDEO/AUX terminals.
[TAPE 1] — Press when listening to tape playback with a tape deck.
[TAPE 2/ADAPTOR] — Press when using a component (sound processor, graphic equalizer) connected to the TAPE 2/ADAPTOR terminals. Also can be used during tape playback when a tape deck is connected to these terminals.

NOTE:

When a component is not connected to the TAPE 2/ADAPTOR terminals, or when the component connected is not being used, be sure to set the (TAPE 2/ADAPTOR) switch to the OFF position (the indicator will go out). If set to the ON position, no sound will be heard.

③ FLUORESCENT DISPLAY

[VOLUME/BALANCE] — Normally (VOLUME) indicates the sound volume. The larger the numbers, the larger the sound volume. When the BALANCE switch is pressed, the display's function switches to indicating the right/left balance of sound (after a few seconds, the display will automatically switch back to its volume function).

[LOUDNESS] — Lights when the LOUDNESS switch is set to the ON position.

[MUTING] — Lights when the MUTING switch is set to the ON position.

④ VOLUME switches

These are used for controlling the sound volume.

[VOLUME UP] — Increases the sound volume.

[VOLUME DOWN] — Decreases the sound volume.

⑤ PHONES jack

When using headphones, insert their plug into this jack. The sound from the speakers will automatically be disconnected.

⑥ MIC jack

When using a microphone, insert its plug into this jack.

⑦ TREBLE tone control

Use for adjusting the high-frequency tone.

The central "0" position is the flat (normal) position. When moved to the right, high-frequency tones are emphasized; when moved to the left, high-frequency tones are deemphasized.

⑧ BASS tone control

Use to adjust the low-frequency tone. The central "0" position is the flat (normal) position. When moved to the right, low-frequency tones are emphasized; when moved to the left, low-frequency tones are deemphasized.

⑨ MIC MIXING control

Use to adjust the sound balance between the microphone connected to the MIC jack, and components (tuner, tape deck, turntable, CD player, etc.) connected to the rear panel.

When the control is moved to the MIC side, the sound from the microphone will be at a maximum, while the sound from the other components will not be heard.

When moved to the SOURCE side, the sound from components will be at a maximum, and the microphone sound will not be heard.

NOTE:

When performing playback of source components only, leave the control set to the SOURCE side.

⑩ BALANCE switches

Normally, set so that the control display's BALANCE function indicates at the center position. (When L and R are pressed simultaneously, the balance will be adjusted to the center position.) If the sound heard from the speakers appears to be too loud on one side, adjust as follows: If the right side is too loud, press L. If the left side is too loud, press R.

⑪ LOUDNESS switch

Press when listening at a low volume level.

When pressed ON, the control display's LOUDNESS indicator will light. Very low- and very high-frequency sounds will be augmented, thus giving a more powerful sound quality even at low listening levels.

⑫ MUTING switch

Use to temporarily cut sound volume.

When pressed ON, the control display's MUTING indicator will light, and sound volume will be cut by 20 dB. When set to OFF, the sound will return to its previous volume.

When the power to the unit is turned OFF, a built-in microcomputer automatically memorizes the positions of the following switches, and will maintain that memory for approximately 1 week when the unit is not used. As a result, when the power is turned ON, the previously set switch positions will be set again automatically.

- FUNCTION switches • VOLUME switch
- LOUDNESS switch • MUTING switch
- BALANCE switches

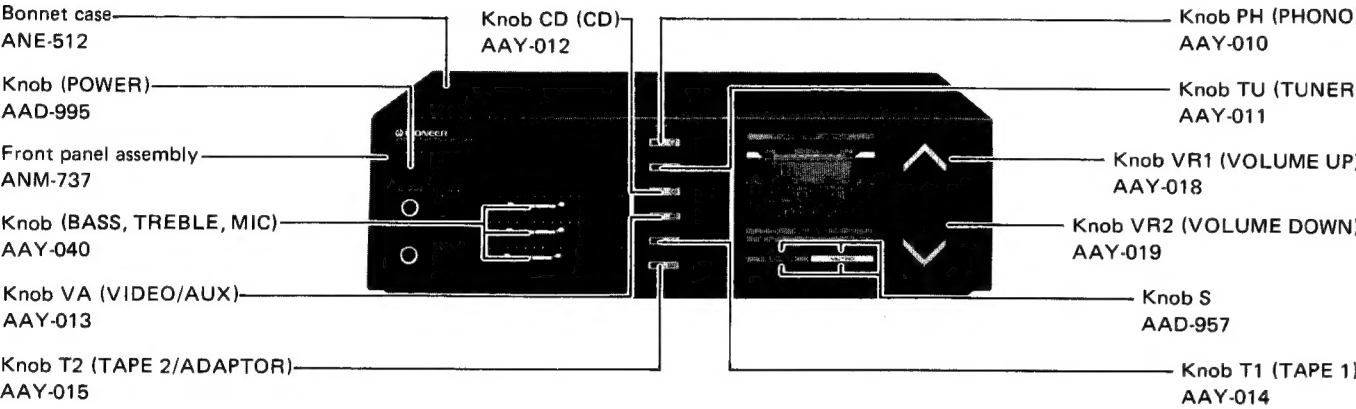
If the unit is not used for more than one week, the memorized positions will be cancelled, and the following positions will be set:

- VOLUME switch — Minimum
- LOUDNESS switch, MUTING switch — OFF
- BALANCE switches — Center

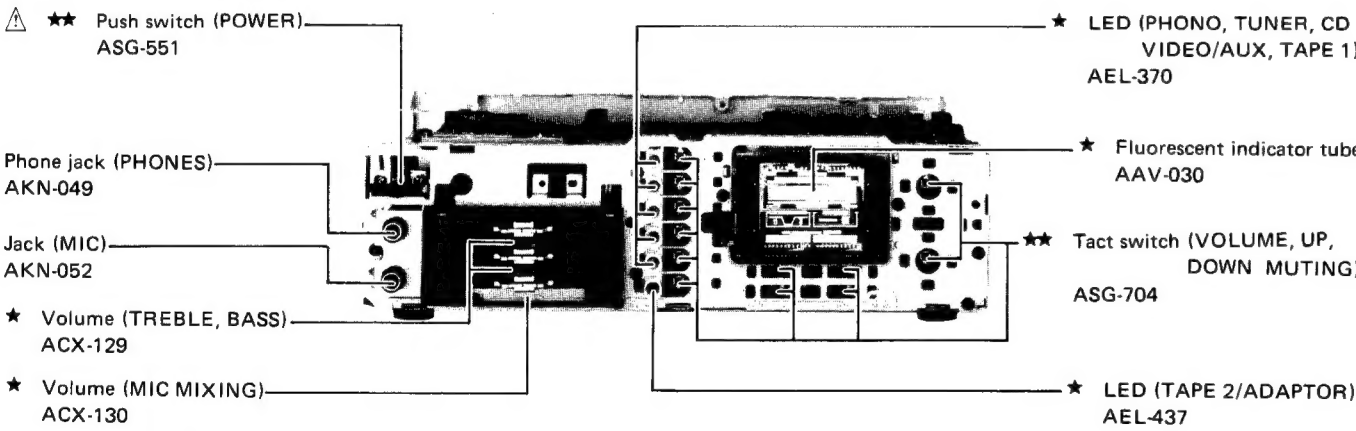
3. PARTS LOCATION

- NOTES:
- Parts without part number cannot be supplied.
 - The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
 - ★★ **GENERALLY MOVES FASTER THAN ★.**
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

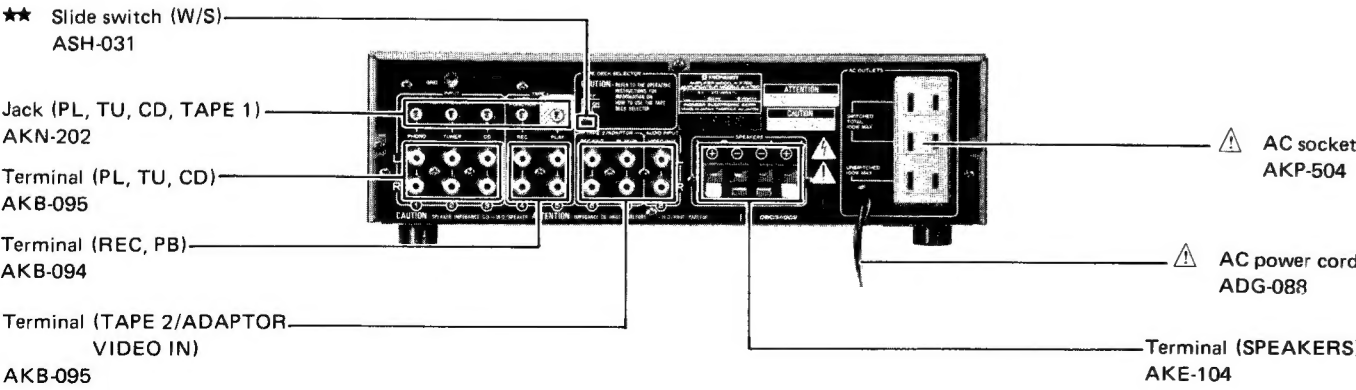
Front Panel View



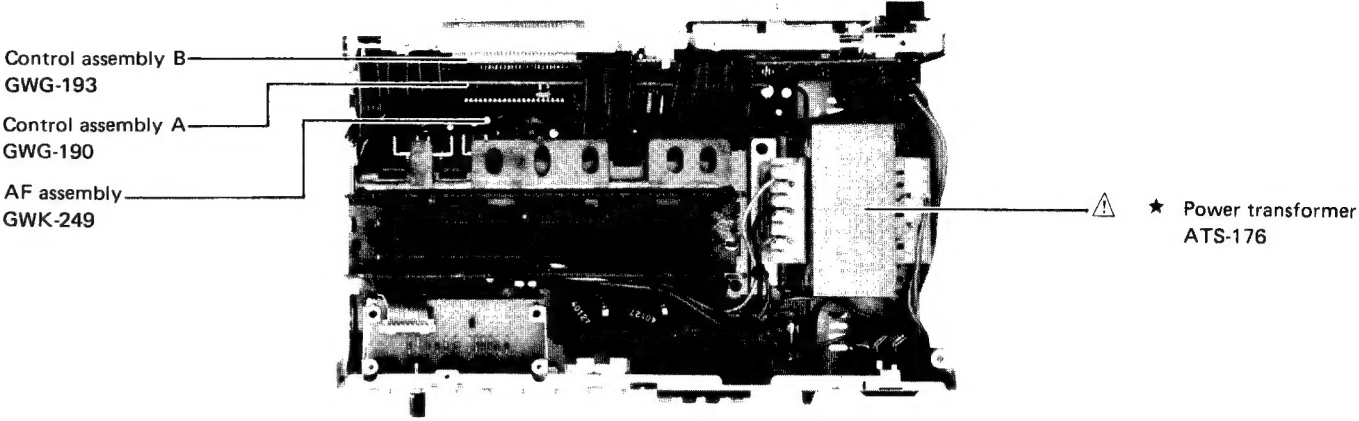
Front View with Panel Removed



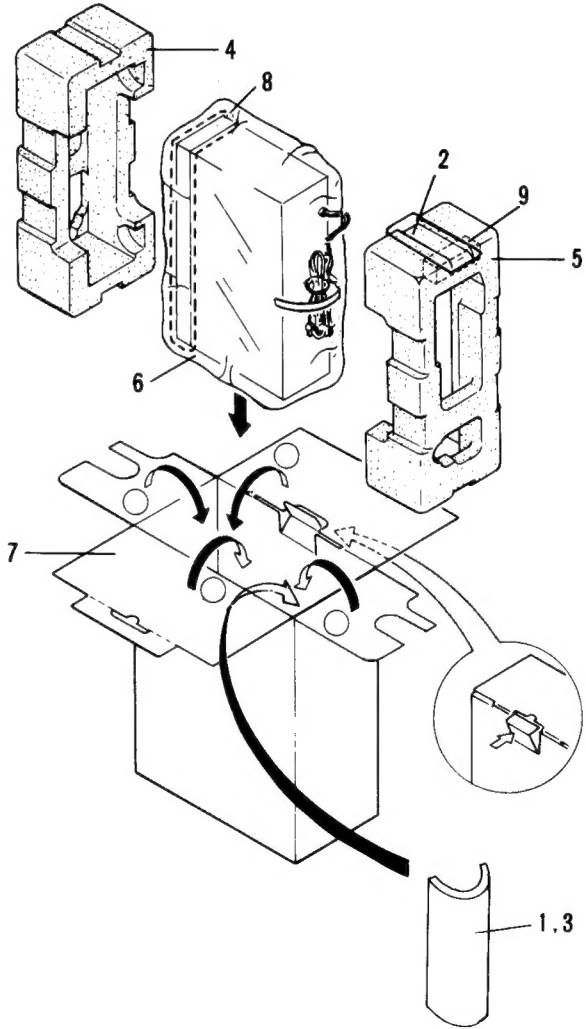
Rear Panel View



Top View

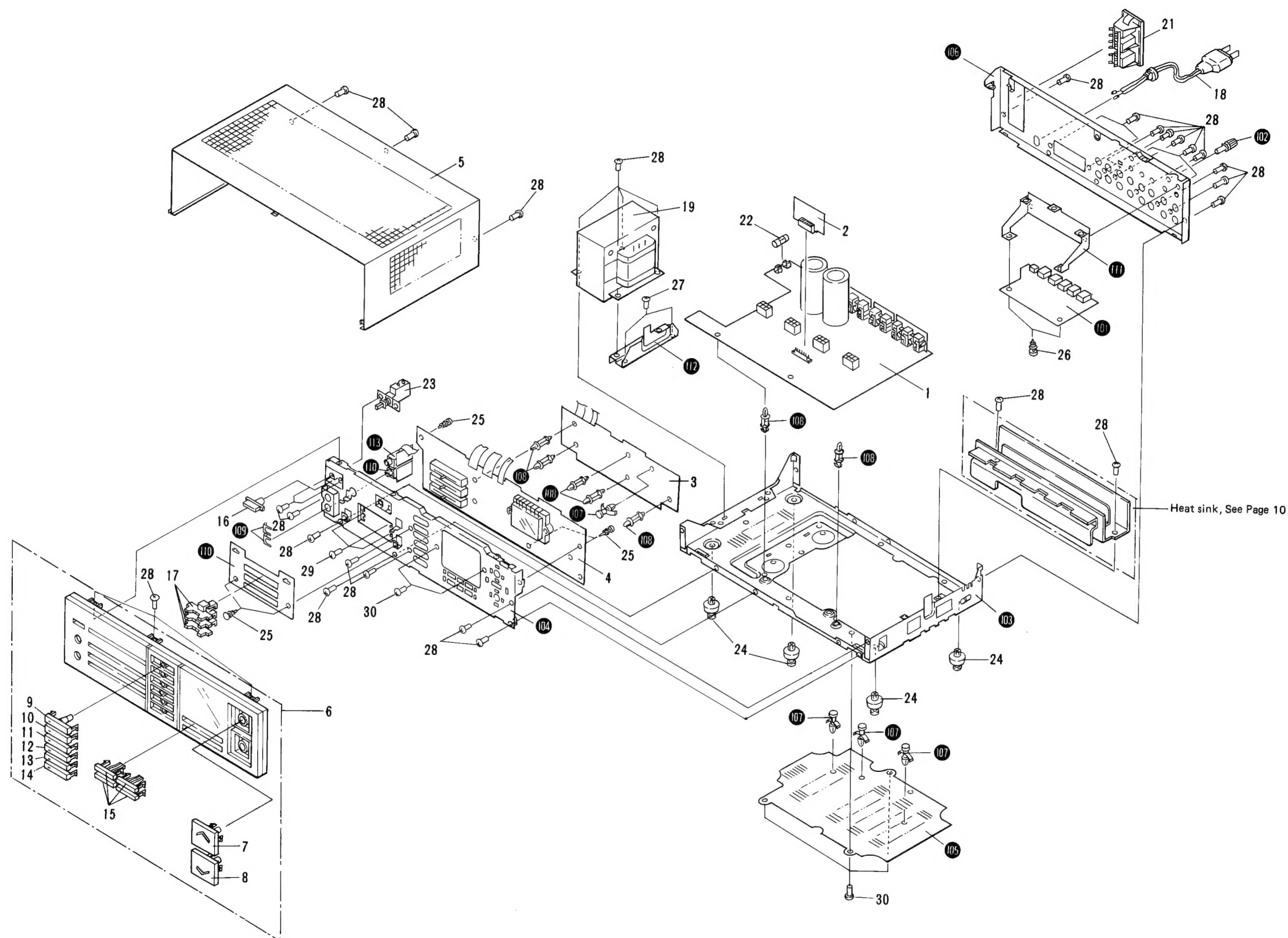


4. PACKING



| Mark | No. | Part No. | Description |
|------|-----|----------|------------------------|
| | 1 | ARB-647 | Operating instructions |
| | 2 | AHG-117 | Vinyl pouch |
| | 3 | ARH-070 | Sub instruction manual |
| | 4 | AHA-324 | Front pad |
| | 5 | AHA-325 | Rear pad |
| | 6 | AHG-125 | Sheet |
| | 7 | AHE-478 | Packing case assembly |
| | 8 | AHG-128 | Sheet |
| | 9 | AHB-131 | Pad |

A



—Heat sink, See Page 10

B

C

D

A

B

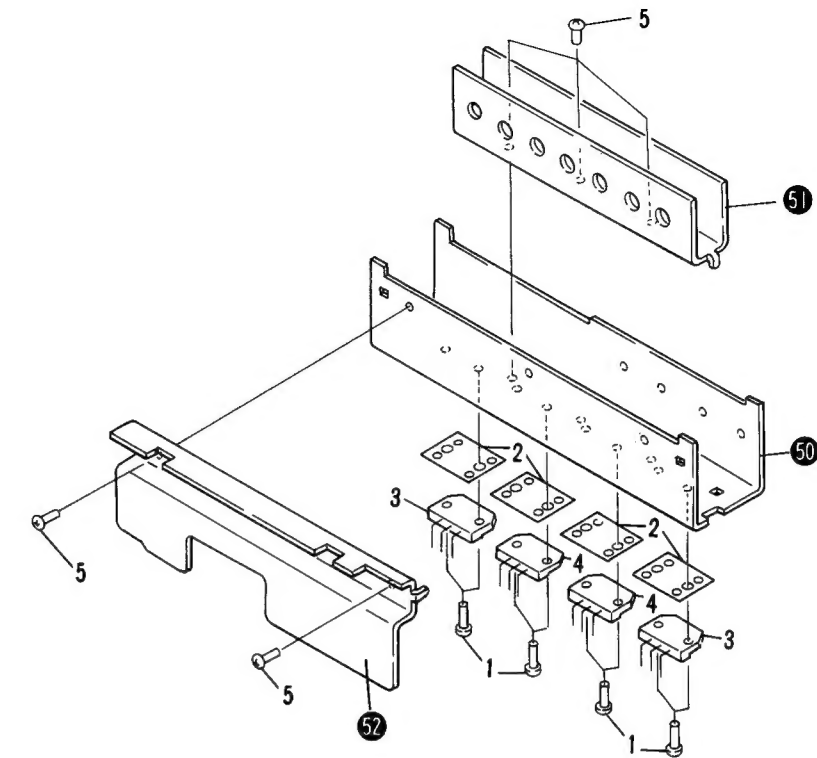
C

D

- Parts without part number cannot be supplied.
- The \triangle mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.
★★ GENERALLY MOVES FASTER THAN ★.
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

| Mark | No. | Part No. | Description | Mark | No. | Part No. | Description |
|----------------|-----|--------------|----------------------------|------|-----|----------|---------------------|
| | 1 | GWK-249 | AF assembly | | 100 | | Jack assembly (MIC) |
| | 2 | GWY-156 | Driver assembly | | 101 | | Mini Jack assembly |
| | 3 | GWG-190 | Control assembly A | | 102 | | Terminal (GND) |
| | 4 | GWG-193 | Control assembly B | | 103 | | Chassis |
| | 5 | ANE-512 | Bonnet case | | 104 | | Panel stay |
| | 6 | ANM-737 | Front panel assembly | | 105 | | Bottom plate |
| | 7 | AAY-018 | Push knob VR1(VOLUME UP) | | 106 | | Rear panel |
| | 8 | AAY-019 | Push knob VR2(VOLUME DOWN) | | 107 | | Print spacer |
| | 9 | AAY-010 | Push knob PH (PHONO) | | 108 | | PCB holder |
| | 10 | AAY-011 | Push knob TU (TUNER) | | 109 | | Mount plate |
| | 11 | AAY-012 | Push knob CD (CD) | | 110 | | Blind sheet |
| | 12 | AAY-013 | Push knob VA (VIDEO/AUX) | | 111 | | PCB holder A |
| | 13 | AAY-014 | Push knob T1 (TAPE 1) | | 112 | | PCB holder B |
| | 14 | AAY-015 | Push knob T2 (TAPE 2) | | 113 | | Headphone assembly |
| | 15 | AAD-957 | Push knob S | | | | |
| | 16 | AAD-995 | Power knob (POWER) | | | | |
| | 17 | AAY-040 | Slide knob | | | | |
| \triangle | 18 | ADG-088 | AC Power cord | | | | |
| \triangle ★ | 19 | ATS-176 | Power transformer (120V) | | | | |
| | 20 | ..... | ..... |  |  |  |  |
| \triangle | 21 | AKP-504 | AC socket | | | | |
| \triangle ★★ | 22 | AEK-125 | Fuse (FU1) | | | | |
| \triangle ★★ | 23 | ASG-551 | Push switch (S1) | | | | |
| | 24 | AEP-016 | Leg assembly | | | | |
| | 25 | AEC-471 | Rivet | | | | |
| | 26 | AEC-510 | Rivet | | | | |
| | 27 | BBZ30P080FMC | Screw (3x8) | | | | |
| | 28 | VBZ30P080FZK | Screw (3x8) | | | | |
| | 29 | PMZ20P030FZK | Screw (2x3) | | | | |
| | 30 | VMZ30P060FMC | Screw (3x6) | | | | |

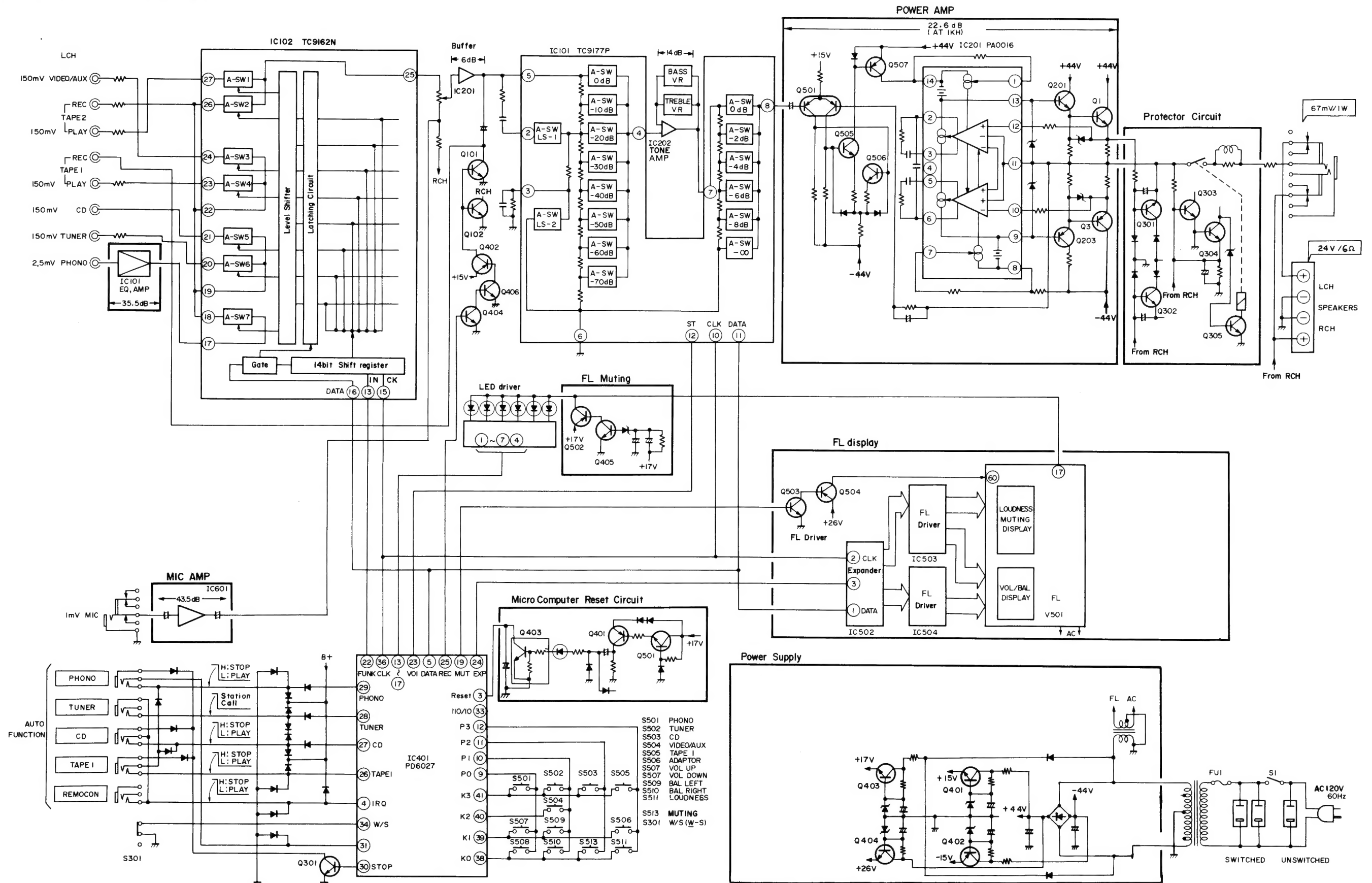
Heat Sink



| Mark | No. | Part No. | Description |
|------|-----|-------------------|--------------------------|
| | 1 | ABA-258 | Screw |
| | 2 | AEC-942 | Mica sheet |
| ★★ | 3 | 2SA1216(A)-G/P/Y* | Q2, Q4, Power transistor |
| ★★ | 4 | 2SC2922(A)-G/P/Y* | Q1, Q3, Power transistor |
| | 5 | BBZ30P080FZK | Screw |
| | 50 | | Heat sink |
| | 51 | | Sub heat sink B |
| | 52 | | Sub heat sink A |

*hfe of Q1—Q4 should have the same value.

6. BLOCK DIAGRAM



7. CIRCUIT DESCRIPTIONS

Function Switching

If one of the switches S501 thru S506 in Fig. 7.6 is pressed, the PD6027 microcomputer (IC401) detects which switch has been pressed, and by controlling the TC9162N electronic switch (IC102), switches the unit to the selected function.

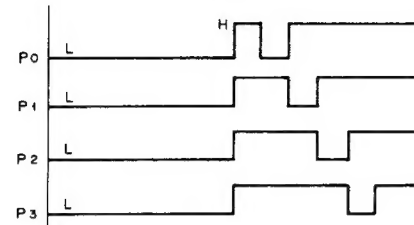


Fig. 7-1

Key scanning is started only when one of the keys in the matrix is pressed. P0 thru P3 are all at L level before any key is pressed, but are switched to H level once a key is pressed. At the same time, a microcomputer reads which key has been pressed at K0 thru K3, and then decides whether the pressed key is a function key or a volume key. If a function key, the current function position is compared with the pressed function. If this comparison shows that the two are different functions, function data corresponding to the pressed key is passed to the TC9162N. The configuration of this data is outlined in Fig. 7.2.

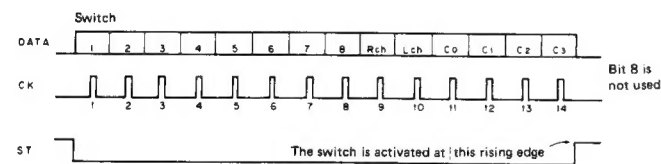


Fig. 7-2

The data consists of 14 bits with bits 1 thru 7 corresponding to PHONO, TUNER, CD, etc., and the bit for the switch to be switched on is switched to H level. Bits 9 and 10 are the left and right channel selector bits, while bits 11 thru 14 are TC9162N code bits.

Volume Control

Volume control operations involve the use of a microcomputer (IC401) combined with the TC9177P electronic volume control (IC101) as indicated in Fig. 7.7.

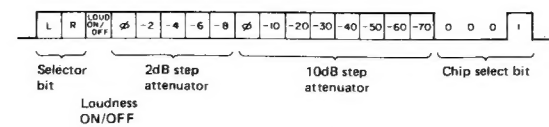


Fig. 7-3

20-Bit serial data corresponding to the pressed key and the current volume level is passed from the microcomputer for both left and right channels in that order. TC9177P (IC101) stores the 20 bits of data in a 20-bit shift register, and then activates each switch by strobe signal to achieve the selected degree of attenuation.

If bit 3 of the data is switched to H level, LS-1 is switched on and LS-2 is switched off resulting in the loudness being switched on to achieve a loudness effect if the volume level is less than -20dB.

Muting

TC9177P (IC101) attenuation is changed by 20dB by data similar to the VR control data.

Volume UP & DOWN Switches

Pressing the UP (S507) or DOWN (S508) switch continuously results in continuous volume changes. The DOWN switch, however, is set to change the volume at a faster rate.

The volume level can be controlled in 2dB steps from 0dB to 76dB, and down to -infinity in 40 steps.

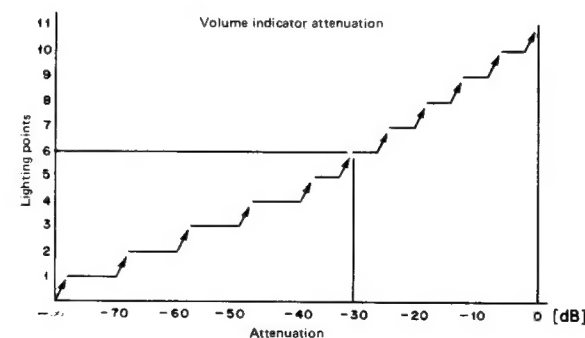


Fig. 7-4

L and R Balance Switches

Pressing the L (S509) or R (S510) balance switch once results in the display being switched to a balance display. Pressing either switch continuously results in continuous switching operation, and pressing both together results in the balance being set to center.

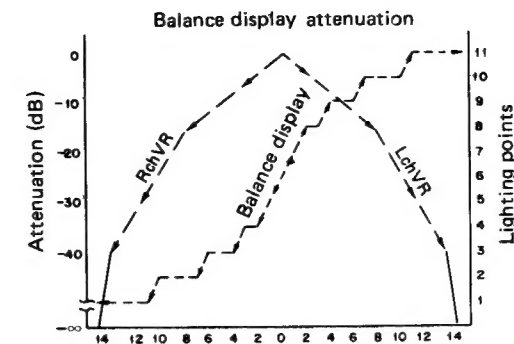


Fig. 7-5

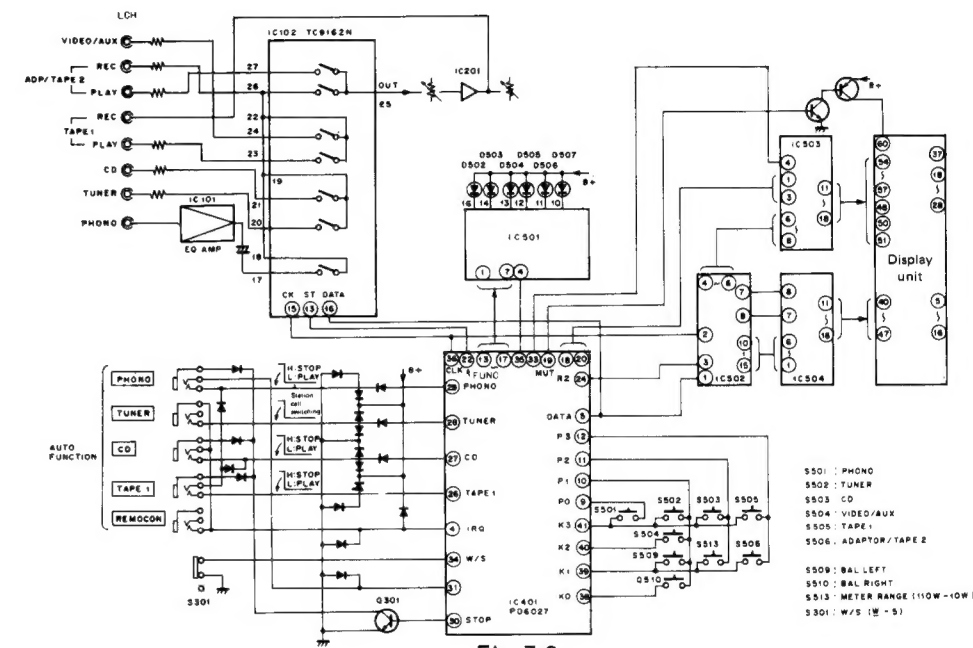


Fig. 7-6

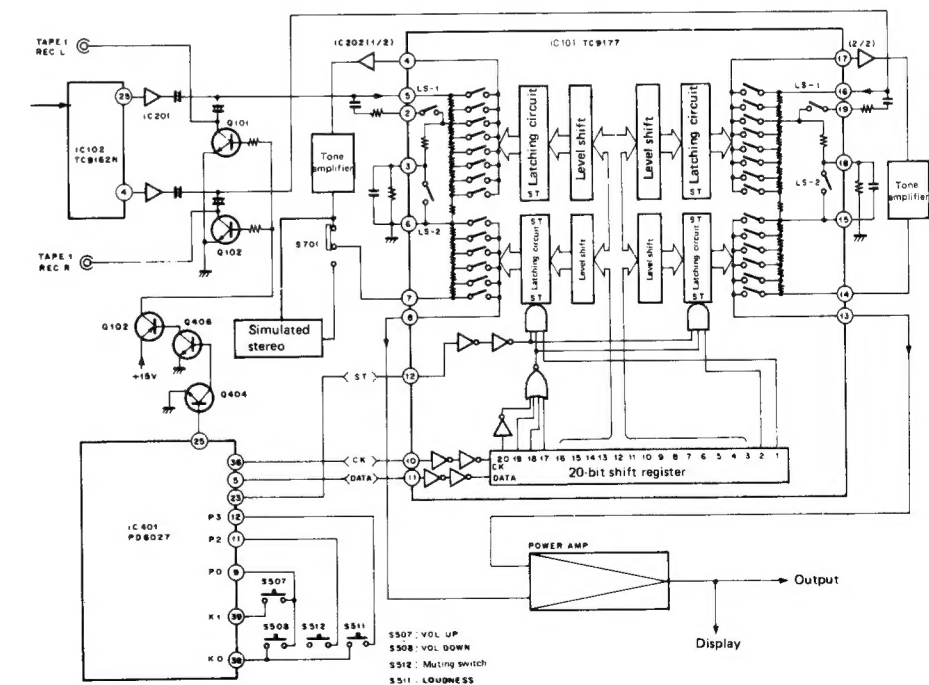


Fig. 7-7

Automatic Function Switching

If audio components featuring "one-touch auto-play" functions are connected to the relevant PHONO (PL), TUNER (TX), CD, or TAPE1(CT) "AUTO FUNCTION" terminal on the rear panel of the A-X700, the function is switched automatically to the operated component.

When the PLAY or STATION CALL switch of the component connected to the PHONO, TUNER, CD, or TAPE1 terminal is switched on, the generated L level signal is passed to the microcomputer which in turn passes corresponding data to the function switch (TC9162N) to effect the actual switching operation.

Stop Signal

When a function is switched by automatic function switching or amplifier function switching, an H level signal is generated at pin 30 of the microcomputer. Q301 is thus turned on, and auto stop output signals are passed to PL, CD, and CT.

Double Deck and Single Deck Switching

S301 is switched according to whether the tape deck connected to TAPE1 is a double or single deck. When a double deck is used, S301 is switched on resulting in pin 25 of the microcomputer remaining at H level. Q404 is thus turned on, and Q406 then Q102 are turned off. When Q101 and Q102 are both turned off, REC1 is switched on.

When S301 is off, pin 25 of the microcomputer is switched to H or L level depending on whether or not function has been switched to TAPE1. If the function has been switched to TAPE1, pin 25 is switched to L level, resulting in Q101 and Q102 being turned on and REC1 being switched off. When the function is switched to other positions, the reverse occurs.

Remote Control Terminal

The photosensitive section of the remote control mechanism is located in the tuner. Upon reception of a remote control signal in the tuner, a VR UP, DOWN, muting, VIDEO/AUX, or tuntable start/stop signal is decoded by the microcomputer. Remote control signals for CD or TAPE1 are passed direct from the tuner.

Microcomputer Reset Circuit

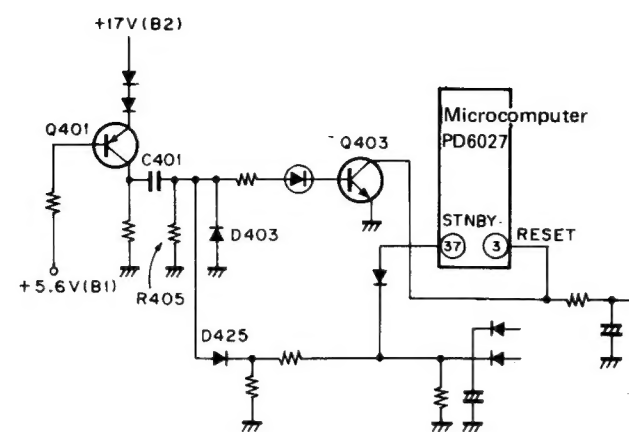


Fig. 7-8

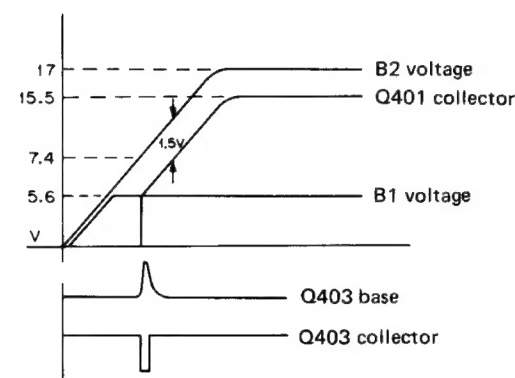


Fig. 7-8-1

The microcomputer reset circuit is outlined in Fig. 7.7.

When the power is switched on, and the Q401 base voltage (B₁) is increased to 5.6V with the emitter voltage (B₂) in excess of 7.4V, Q401 is turned on and the collector voltage is gradually increased to 15.5V. The Q401 output is differentiated by C401/R405 and then inverted by Q403 to obtain the reset signal.

D425 has been inserted in the circuit to prevent Q403 cut-off at the same time the power is switched off in order to prevent the memory from being switched off by reset circuit misoperation if the power switch is switched on and off in quick succession. The reset signal resets the microcomputer once clock oscillation (3.84 MHz) has been commenced when the STANDBY pin (No.37) voltage is increased after the power is switched on.

PD6027 Functions

| Pin No. | Pin Name | Function | Active |
|---------|-----------------|---|--------------------|
| 1 | EX | 3.84 MHz resonator is connected between these pins. | |
| 2 | X | | |
| 3 | RESET | Positive power supply (VDD) connection | L |
| 4 | IRQ | Remote control signal input | L |
| 5 | SO | Serial data output to PD0012, TC9177P, and TC9162N. | |
| 6 | SI | | |
| 7 | SC/T0 | NC | |
| 8 | Tc | | |
| 9 | P _φ | | L |
| 10 | P ₁ | Output of key matrix drive signals | L |
| 11 | P ₂ | | L |
| 12 | P ₃ | | L |
| 13 | O _φ | Indicator outputs | TAPE 1 H |
| 14 | O ₁ | | CD H |
| 15 | O ₂ | | TUNER H |
| 16 | O ₃ | | PHONO H |
| 17 | O ₄ | | TAPE 2 H |
| 18 | O ₅ | | LOUDNESS H |
| 19 | O ₆ | | MUTING H |
| 20 | O ₇ | | BARANCE H |
| 21 | V _{SS} | GND | |
| 22 | R _φ | Strobe outputs | TC9162N L |
| 23 | R ₁ | | TC9177P L |
| 24 | R ₂ | | PD0012 L |
| 25* | R ₃ | REC OUT switch (output switched on) | H |
| 26 | R ₄ | Auto function input | TAPE 1 L |
| 27 | R ₅ | | CD L |
| 28 | R ₆ | | TUNER L |
| 29 | R ₇ | | PHONO L |
| 30* | R ₈ | Output of auto stop signals | H |
| 31 | R ₉ | Output of turntable remote control signal | L |
| 32 | R _φ | Indicator outputs | VOLUME H |
| 33 | R ₁₁ | | 110W meter range H |
| 34 | R ₁₂ | Double cassette deck selector input | L |
| 35 | R ₁₃ | Indicator output VIDEO/AUX | H |
| 36 | R ₁₄ | Serial data clock | |
| 37 | STBY | Back-up mode starter input | L |
| 38 | K _φ | Key inputs | L |
| 39 | K ₁ | | L |
| 40 | K ₂ | | L |
| 41 | K ₃ | | L |
| 42 | VDD | 5 V | |

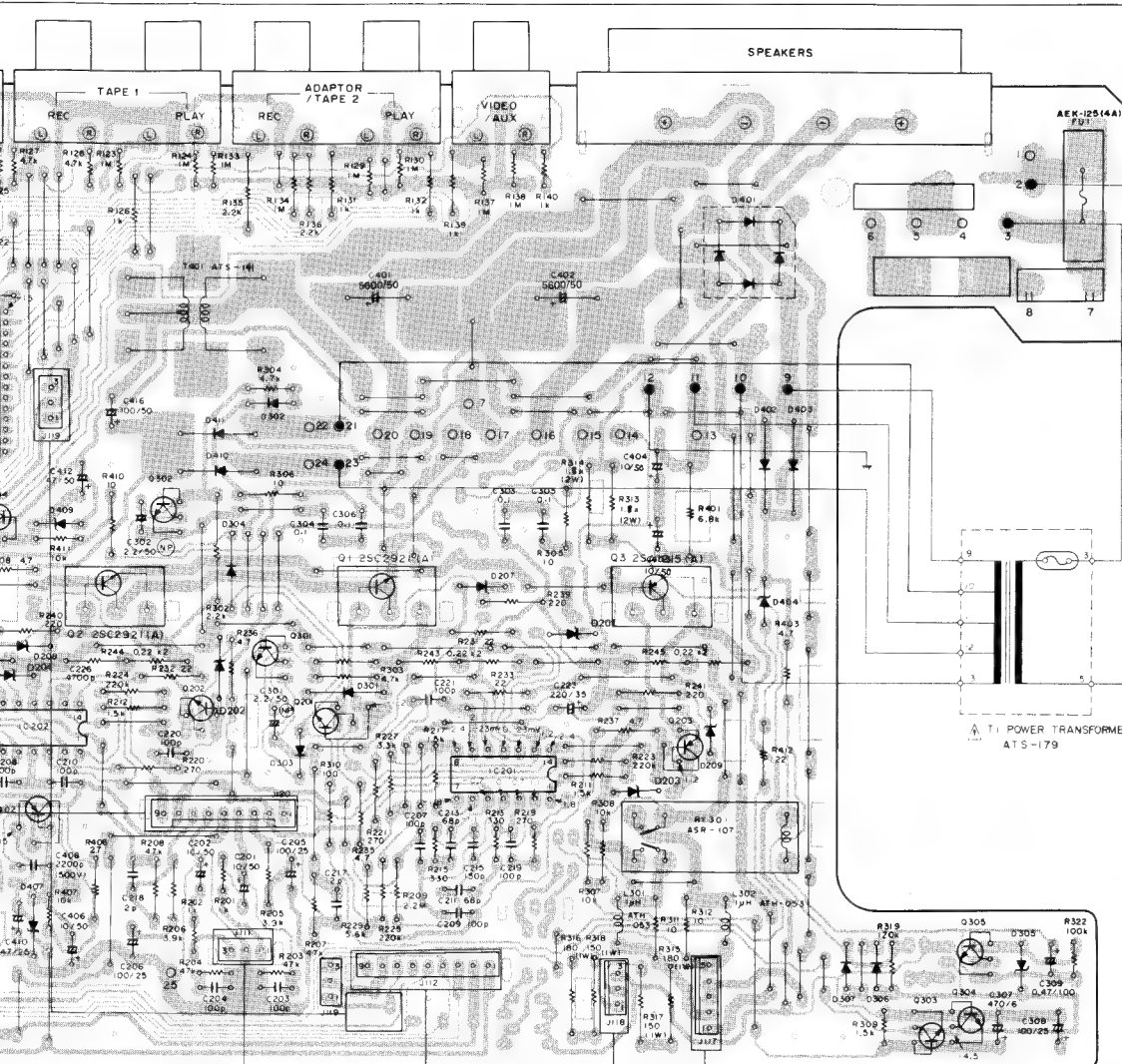
*Pin No. 25.

The R12 pin is at H level. Pin 25 is switched to L level when TAPE1 function is selected, but is switched to H level in other function positions, and R12 remains at H level.

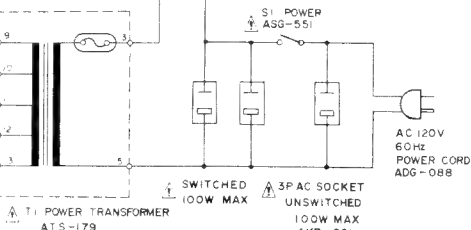
*Pin No. 30

Switched to H level for 100msec immediately following function switching.

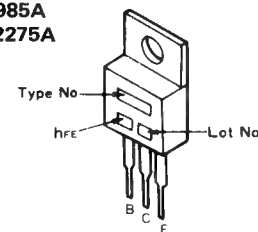
IC202
Q402
Q302
Q202
Q301
Q201
IC201
Q203
Q305
Q303
Q304



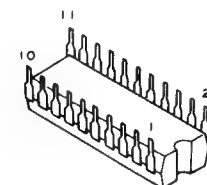
Q201A, 202A : 2SC2238
(2SC2275A)
Q203A, 204A : 2SA968
(2SA985A)
Q301, 302 : 2SC2705
Q303, 304 : 2SC1740S
(2SC2603)
Q305 : 2SD438(A)
Q401, 403 : 2SD836A
Q402 : 2SB750A
Q404 : 2SD438
IC101 : NJM2043DD
IC102 : TC9162N
IC201, 202 : PA0016
D201~204 : KZL056
D207~210 : RD27EB
D301~304, 306, 307 : IS1554
D305 : KZL140
D401 : RB602
D402, 403 : S5566
D404 : RD22EB
D406, 407 : RD16EB
D409 : RD27EB
D410, 411 : S5566



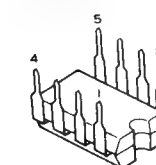
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2SC2275A



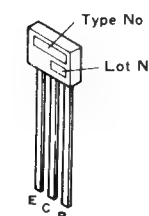
TC9177P



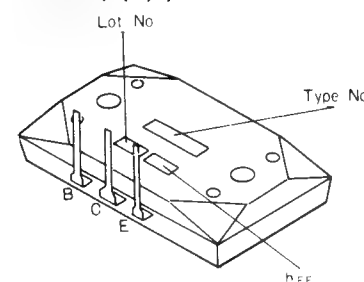
NJM4558DXC
NJM2043DD



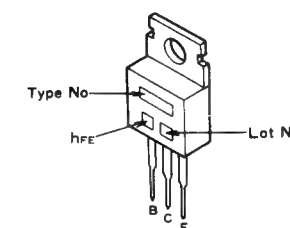
RN1203
RN2203



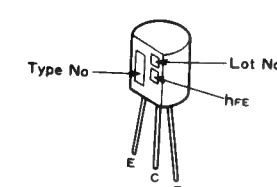
2SC2922(A)G/P/Y
2SA1216(A)G/P/Y



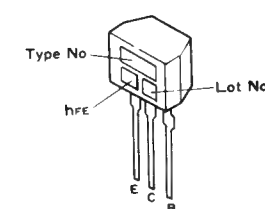
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2SB750A
2SC2238-O/Y
2SD836A



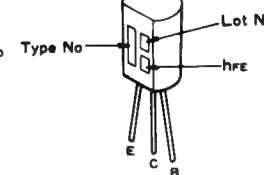
2SC2705
2SA1145
2SC2878



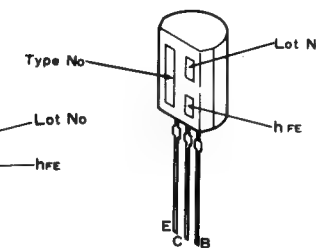
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2SA933S



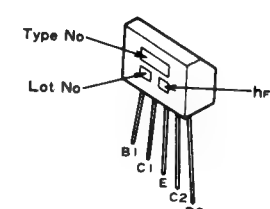
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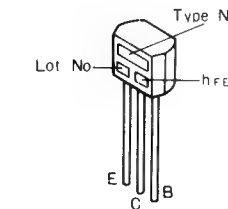
2SD438



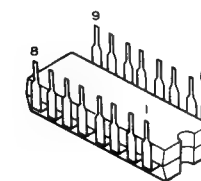
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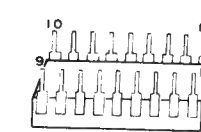
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2SC2603



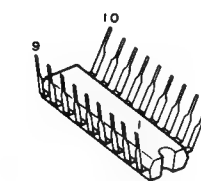
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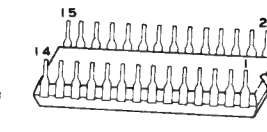
PD0012



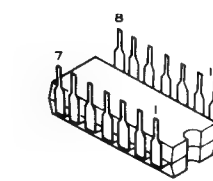
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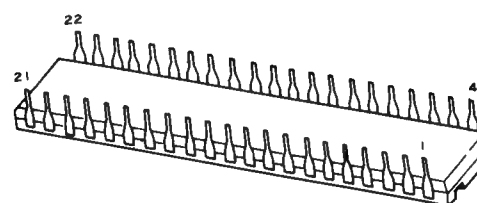
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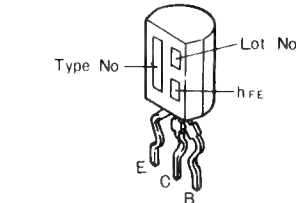
PA0016



PD6027



2SD438(A)-F



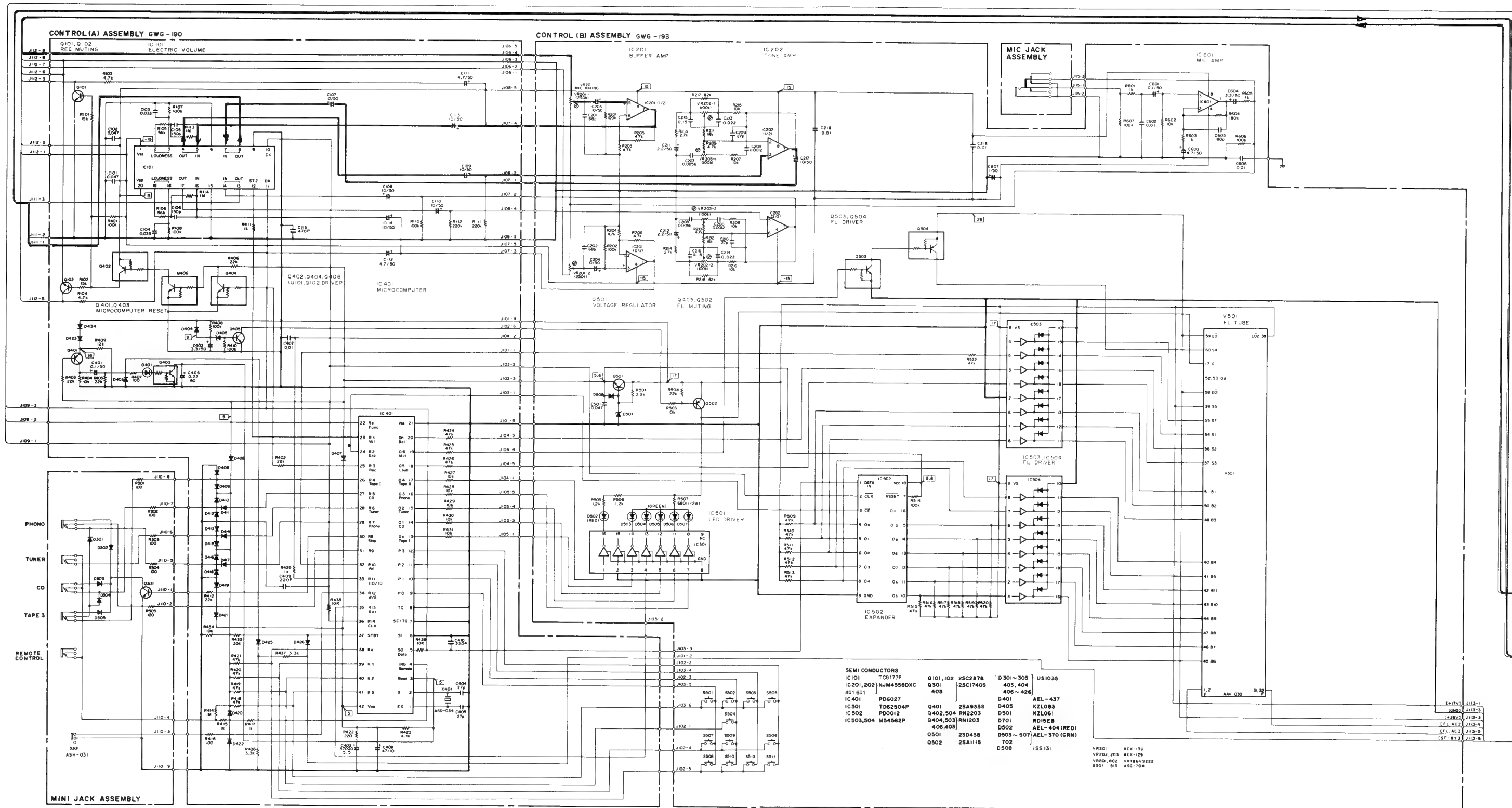
9. SCHEMATIC DIAGRAM

A

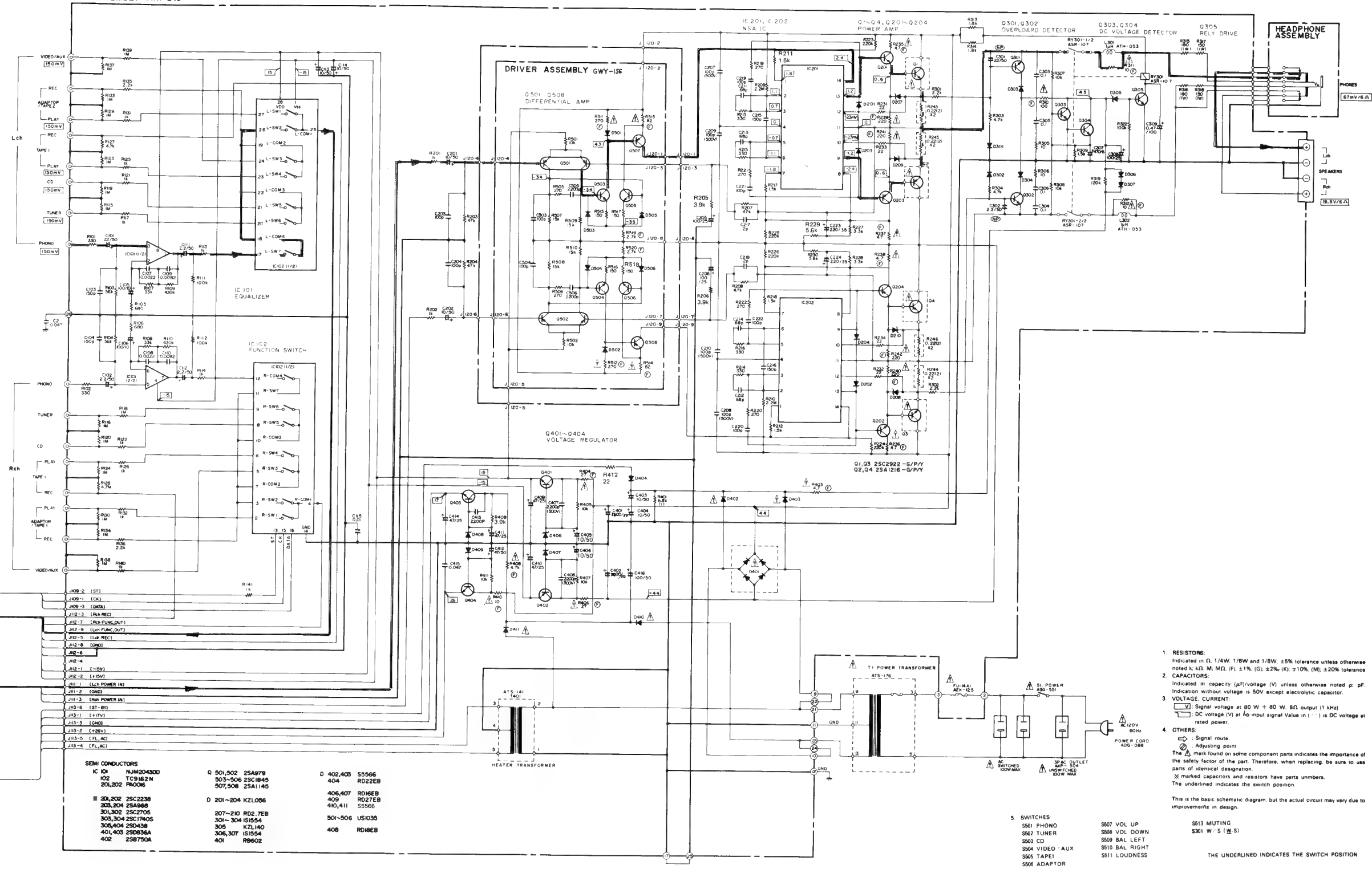
B

C

D



AF ASSEMBLY GWK-249



10. ELECTRICAL PARTS LIST

NOTES:


- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω 56 × 10¹ 561 RD¼PS 561J
 47kΩ 47 × 10³ 473 RD¼PS 473J
 0.5Ω 0R5 RN2H 0R5K
 1Ω 010 RS1P 010K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).



5.62kΩ 562 × 10¹ 5621 RN¼SR 5621F

- The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.
★★ GENERALLY MOVES FASTER THAN ★.
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

P.C.B. ASSEMBLIES







| Mark | Symbol & Description | Part No. |
|------|--------------------------|----------|
| | AF Assembly | GWK-249 |
| | Driver Assembly | GWY-156 |
| | Control Assembly A | GWG-190 |
| | Control Assembly B | GWG-193 |
| | Microphone Jack Assembly | |
| | Mini-jack Assembly | |
| | Headphones Assembly | |

SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|---|----------------------|-------------------|
|  ★★ | Q1, Q3 | 2SC2922(A)-G/P/Y* |
|  ★★ | Q2, Q4 | 2SA1216(A)-G/P/Y* |

*hfe of Q1-Q4 should have the same value.

OTHERS

| Mark | Symbol & Description | Part No. |
|---|----------------------|--------------|
|  ★★ | C2 Ceramic Capacitor | CKDYF473Z 50 |
|  ★ | Power Transformer | ATS-176 |
|  ★★ | AC socket | AKP-504 |
|  ★★ | Push Switch | ASG-551 |
|  ★★ | FU1 Fuse (4A) | AEK-125 |
|  ★ | AC power cord | ADG-088 |
| | Mica Sheet | AEC-942 |

AF Assembly (GWK-249)

SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|-----------|----------------------|----------------------------|
| ★★ | IC101 | NJM2043DD |
| ★★ | IC201, IC202 | PA0016 |
| ★★ | IC102 | TC9162N |
| ★★ | Q203, Q204 | 2SA968-O/Y* (2SA985(A)) |
| ★★ | Q402 | 2SB750A |
| ★★ | Q303, Q304 | 2SC1740S (2SC2603) |
| ★★ | Q201, Q202 | 2SC2238-O/Y* (2SC2275A) |
| ★★ | Q301, Q302 | 2SC2705 |
| ★★ | Q305 | 2SD438(A)-F |
| ★★ | Q404 | 2SD438 |
| ★★ | Q401, Q403 | 2SD836A |

★ D201 - D204
★ D305
★ D401
★ D406, D407


★ D408

★ D207 - D210

★ D404
★ D409
★ D402, D403, D410, D411
★ D301-D304, D306, D307

*hfe of Q201-Q204 should have the same value.

COILS & TRANSFORMER

| Mark | Symbol & Description | Part No. |
|--|---------------------------|----------|
| | L301, L302 (1μH) | ATH-053 |
|  ★ | T401 (Heater transformer) | ATS-141 |

RELAY








| Mark | Symbol & Description | Part No. |
|------|----------------------|----------------------|
| | RY301 | ASR-107 (ASR-109) |

CAPACITORS

| Mark | Symbol & Description | Part No. |
|------|-------------------------|----------------|
| | C401, C402 (5600/50V) | ACH-244 |
| | C203, C204, C219 - C222 | CCDSL 101J 50 |
| | C207 - C210 | CCDSL 101K 500 |
| | C103, C104, C215, C216 | CCDSL 151J 50 |
| | C211 - C214 | CCDSL 680J 50 |
| | C301, C302 | CEANP 2R2M 50 |
| | C309 | CEAR 47M 100L |
| | C223, C224 | CEAS 221M 35 |
| | C403, C404, C201, C202 | CEA 100M 50L |
| | C113, C114, C405, C406 | |
| | C105, C106 | CEA 101M 10L |
| | C308 | CEA 101M 25L |
| | C416 | CEA 101M 50L |
| | C111, C112 | CEA 2R2M 50L |
| | C409 - C411, C414 | CEA 470M 25L |
| | C412 | CEA 470M 50L |
| | C307 | CEA 471M 6L |
| | C101, C102 | CEXA 2R2M 50 |
| | C205, C206 | CEXA 101M 25 |
| | C407, C408, C413 | CKDYB 222K 50 |
| | C415 | CKDYF 473Z 50 |
| | C217, C218 | CMA020D 500 |
| | C303 - C306 | CQMA 104K 50 |
| | C107, C108 | CQMA 222J 50 |
| | C109, C110 | CQMA822J 50 |
| | C115 | CKDYF 103Z 50 |

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

| Mark | Symbol & Description | Part No. |
|---|-------------------------|----------------|
|  ★★ | R243 - R246 (0.22 Ω 2W) | ACN-131 |
|  ★★ | R404, R406 | RD1/4PMFL 100J |
|  ★★ | R408 | RD1/4PMFL 4R7J |
|  ★★ | R311, R312, R410 | RFA1/4PS100J |
|  ★★ | R310 | RFA1/4PS101J |
|  ★★ | R239 - R242 | RFA1/4PS221J |
|  ★★ | R235 - R238, R403 | RFA1/4PS4R7J |
| | R317, R318 | RS1PMF151J |

| Mark | Symbol & Description | Part No. |
|------|-----------------------------|--------------|
| | R315, R316 | RS1PMF181J |
| | R313, R314 | RS1PMF182J |
| | R401 | RS1PMF682J |
| | R205 - R212, R317, R218, | RD1/4PM □□□J |
| | R227 - R234, R305, R306 | |
| | Resistors other than above. | RD1/8PM □□□J |

OTHERS

| Mark | Symbol & Description | Part No. |
|------|------------------------|--------------|
| | Terminal 4P (REC. PB) | AKB-094 |
| | Terminal 6P | AKB-095 |
| | Terminal 4P (SPEAKERS) | AKE-104 |
| | Transistor Socket | AKH-017 |
| | Screw | PBZ30P060FMC |

Headphone Assembly

| Mark | Symbol & Description | Part No. |
|------|----------------------|----------|
| | Headphone Jack | AKN-049 |

Driver Assembly (GWY-156)

SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|-----------|----------------------|----------|
| ★★ | Q507, Q508 | 2SA1145 |
| ★★ | Q501, Q502 | 2SA979 |
| ★★ | Q503 - Q506 | 2SC1845 |
| ★ | D501 - D506 | US1035 |

CAPACITORS

| Mark | Symbol & Description | Part No. |
|------|----------------------|--------------|
| | C503, C504 | CMA 101J 500 |
| | C505, C506 | CQMA 222J 50 |

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

| Mark | Symbol & Description | Part No. |
|------|-----------------------------|----------------|
| | R519, R520 | RD1/4PMFL 272J |
| | R511, R512 | RFA1/4PS 271J |
| | R513, R514 | RFA1/4PS 820J |
| | Resistors other than above. | RD1/8PM □□□J |

OTHERS

| Mark | Symbol & Description | Part No. |
|------|----------------------|----------|
| | 9P Socket | AKP-046 |

Control Assembly (GWG-190)

SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|------|-------------------------|--------------------|
| ★★ | IC401 | PD6027 |
| ★★ | IC101 | TC9177P |
| ★★ | Q404, Q406, Q403 | RN1203 |
| ★★ | Q402 | RN2203 |
| ★★ | Q401 | 2SA933S |
| | | |
| ★★ | Q405 | 2SC1740S |
| ★★ | Q101, Q102 | 2SC2878 |
| ★ | D401 | AEL-437 |
| ★ | D405 | KZL083 |
| ★ | D403, D404, D406 — D426 | US1035 (1S1555) |

CAPACITORS

| Mark | Symbol & Description | Part No. |
|------|-------------------------|---------------|
| | | |
| | C403 | ACH-902 |
| | C404, C405 | CCDCH 270J 50 |
| | C105, C106 | CCDSL 151J 50 |
| | C406 | CEAR 22M 50L |
| | C401 | CEAR 22M 50L |
| | | |
| | C107 — C110, C113, C114 | CEA 100M 50L |
| | C402 | CEA 3R3M 50L |
| | C111, C112 | CEA 4R7M 50L |
| | C408 | CEA 470M 10L |
| | C101, C102 | CKDYF 473Z 50 |
| | | |
| | C103, C104 | CQMA 333K 50 |
| | C404, C419 | CCDSL 221J 50 |
| | C115 | CKDYB 471K 50 |

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

| Mark | Symbol & Description | Part No. |
|------|----------------------|--------------|
| | All resistors | RD1/8PM □□□J |

OTHERS

| Mark | Symbol & Description | Part No. |
|------|----------------------|----------|
| | X401 (Resonator) | ASS-034 |

Control Assembly B (GWG-193)

SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|------|----------------------|------------|
| ★★ | IC503, IC504 | M54562P |
| ★★ | IC201, IC202, IC601 | NJM4558DXC |
| ★★ | IC502 | PD0012 |
| ★★ | IC501 | TD62504P |
| ★★ | Q503 | RN1203 |

| Mark | Symbol & Description | Part No. |
|------|----------------------|----------|
| ★★ | Q504 | RN2203 |
| ★★ | Q502 | 2SA1115 |
| ★★ | Q501 | 2SD438 |
| ★ | D503 — D507 | AEL-370 |
| ★ | D502 | AEL-404 |
| | D508 | 1SS131 |
| ★ | D501 | KZL061 |

SWITCHES

| Mark | Symbol & Description | Part No. |
|------|---------------------------------|----------|
| ★★ | S501 — S511, S513 (Tact switch) | ASG-704 |

CAPACITORS

| Mark | Symbol & Description | Part No. |
|------|----------------------|----------------|
| | C209, C210 | CCDSL 270J 50 |
| | C201, C202 | CCDSL 680J 50 |
| | C601 | CEJANL 0R1M 50 |
| | C604 | CEJANL 2R2M 50 |
| | C603 | CEJANL 4R7M 50 |
| | C607 | CEA010M 50L |
| | C203, C204 | CEA 100M 50L |
| | C218, C605 | CKDYF103Z50 |
| | C501 | CKDYX473M25 |
| | C205, C206 | CQMA122K50 |
| | C215, C216 | CQMA154K50 |
| | | |
| | C213, C214 | CQMA223K50 |
| | C602 | CQMA393K50 |
| | C207, C208 | CQMA562K50 |
| | C211, C212 | CEA2R2M50L |
| | C217 | CEA100M50L |

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

| Mark | Symbol & Description | Part No. |
|------|-----------------------------|--------------|
| ★ | VR202, VR203 (BASS, TREBLE) | ACX-129 |
| ★ | VR201 (MIC-MIXING) | ACX-130 |
| | R507 | RD1/2PM681J |
| | R502 | RFA1/4PS4R7J |
| | Resistors other than above. | RD1/8PM □□□J |

OTHERS

| Mark | Symbol & Description | Part No. |
|------|-------------------------|----------|
| ★ | V501 (Fluorescent tube) | AAV-030 |

Microphone Jack Assembly

| Mark | Symbol & Description | Part No. |
|------|----------------------|----------|
| | Microphone Jack | AKN-052 |

Mini-jack Assembly

SEMI-CONDUCTORS

| Mark | Symbol & Description | Part No. |
|------|----------------------|----------|
| ★★ | Q301 | 2SC1740S |
| ★ | D301 — D305 | US1035 |

SWITCH

| Mark | Symbol & Description | Part No. |
|------|-------------------------|----------|
| ★★ | S301 Slide switch (W-S) | ASH-031 |

RESISTORS

| Mark | Symbol & Description | Part No. |
|------|----------------------|--------------|
| | R301 — R305 | RD1/8 PM101J |

OTHERS

| Mark | Symbol & Description | Part No. |
|------|----------------------|----------|
| | Mini-jack | AKN-202 |

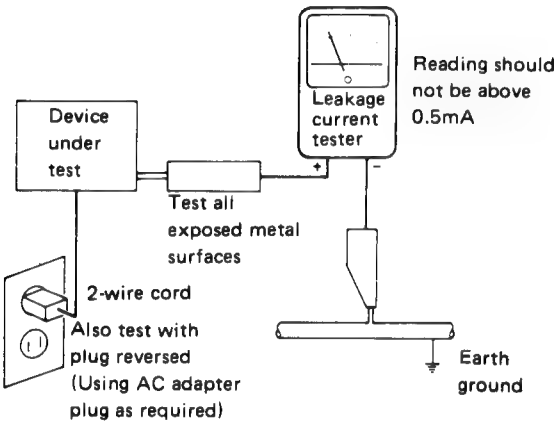
11. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

12. FOR HE TYPE

The HE type is the same as the KU type with the exception of the following section.

Contrast of Miscellaneous Parts

| Mark | Symbol & Description | Part No. | | Remarks |
|------|----------------------------------|-------------------|-----------------|---------|
| | | KU type | HE type | |
| ⚠ ★ | AF assembly | GWK-249 | GWK-251 | |
| | Driver assembly | GWY-156 | GWY-194 | |
| | Power transformer (120V) (220 V) | ATS-176 | ATS-178 | |
| ⚠ ★★ | AC Socket | AKP-504 | AKP-502 | |
| | Push switch (POWER) | ASG-551 (ASG-549) | ASG-552 (.....) | |
| ⚠ ★★ | FU1 (4A) | AEK-125 | AEK-018 | |
| | (T2.5A) | ..... | AEK-403 | |
| ⚠ ★★ | FU2 (T1.25A) | | ADG-068 | |
| | Power cord | ADG-088 | ADG-068 | |
| ⚠ | Operating instructions (English) | ARB-647 | | |
| | (English/French/German/Italian) | ..... | ARE-122 | |
| | Sub instructions | ARR-070 | ARR-071 | |
| | Packing case | AHE-478 | AHE-479 | |

AF assembly (GWK-251)

The AF assembly (GWK-251) is same as the GWK-249 with the exception of the following sections.

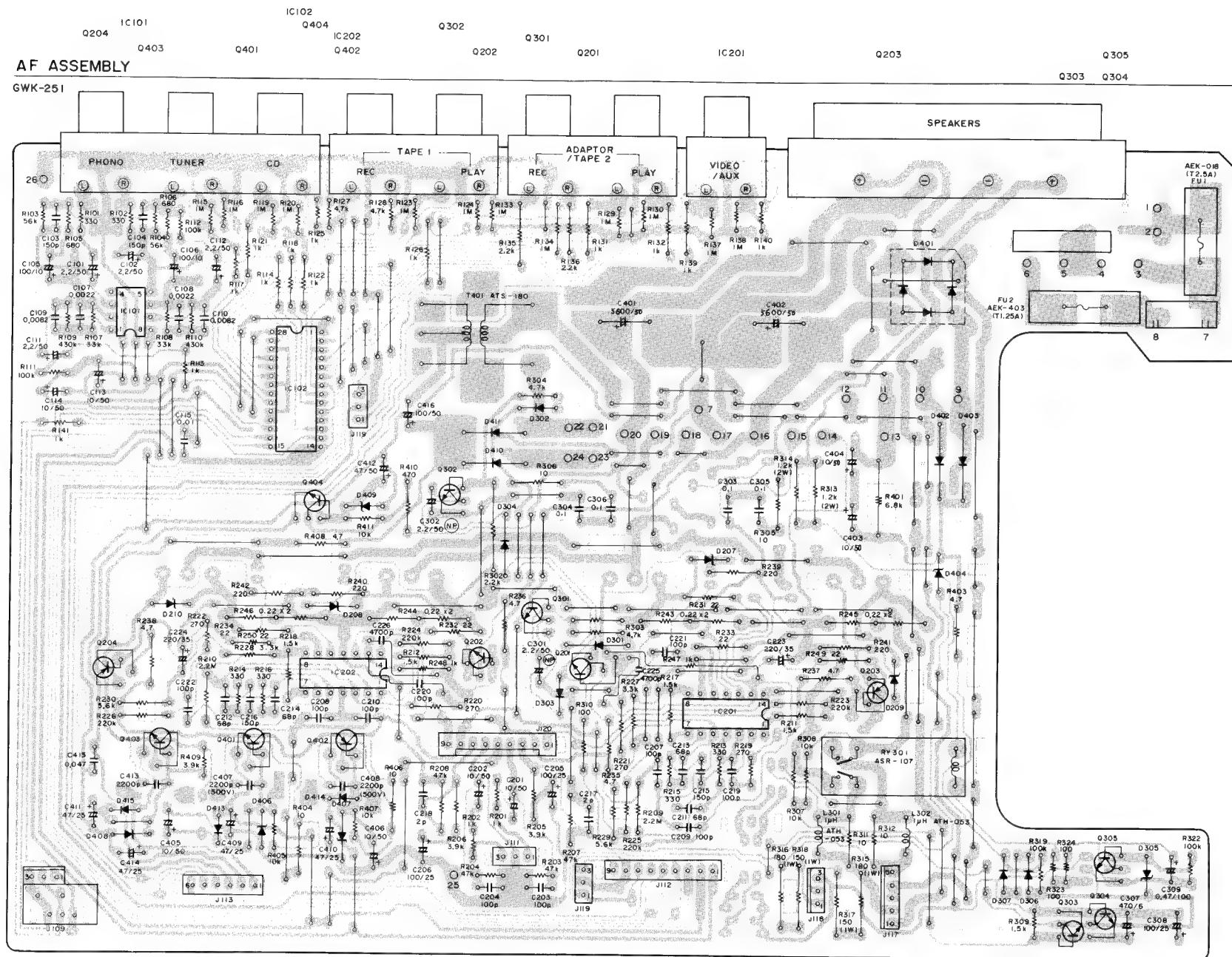
| Mark | Symbol & Description | Part No. | | Remarks |
|------|-------------------------|---------------|---------------|---------|
| | | GWK-249 | GWK-251 | |
| ★ | D201 - D204 | KZL056 | | |
| | D404 | RD22EB | RD18EB | |
| | D413 - D415 | ..... | 1SS131 | |
| | C225, C226 | ..... | CQMA472K50 | |
| | C302 | CEANP2R2M50 | ACH-383 | |
| | C403, C404 | CEA100M50L | ACH-390 | |
| | C412 | CEA470M50L | ACH-385 | |
| | R247 | ..... | RD1/4PM102J | |
| | R248 | ..... | RD1/8PM102J | |
| | R249, R250 | ..... | RD1/8PM220J | |
| | R313, R314 | RS1PMF182J | RS2LMF122J | |
| | R319 | RD1/8PM124J | RD1/8PM104J | |
| | R323, R324 | ..... | RD1/8PM101J | |
| | R408 | RD1/4PMFL4R7J | RFA1/4PS4R7J | |
| | R404, R406 | RD1/4PMFL270J | RD1/4PMFL100J | |
| | R410 | RFA1/4PS100J | RD1/4PM471J | |
| | R412 | RD1/8PM220J | ..... |  |
| ⚠ ★ | T401 Heater transformer | ATS-141 | ATS-180 | |

Driver assembly (GWY-194)

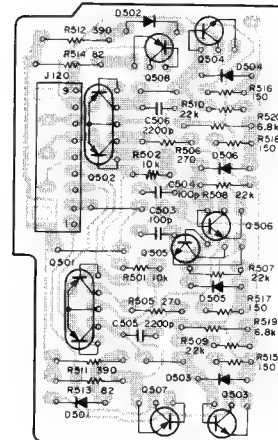
The driver assembly (GWY-194) is the same as the GWY-156 with the exception of the following sections.

| Mark | Symbol & Description | Part No. | | Remarks |
|------|----------------------|---------------|-------------|---------|
| | | GWY-156 | GWY-194 | |
| ⚠ | R507 - R510 | RD1/8PM153J | RD1/8PM223J | |
| | R519, R520 | RD1/4PMFL272J | RS2LMF682J | |
| | R511, R512 | RFA1/4PS271J | RD1/4PM391J | |
| | R513, R514 | RFA1/4PS820J | RD1/4PM820J | |

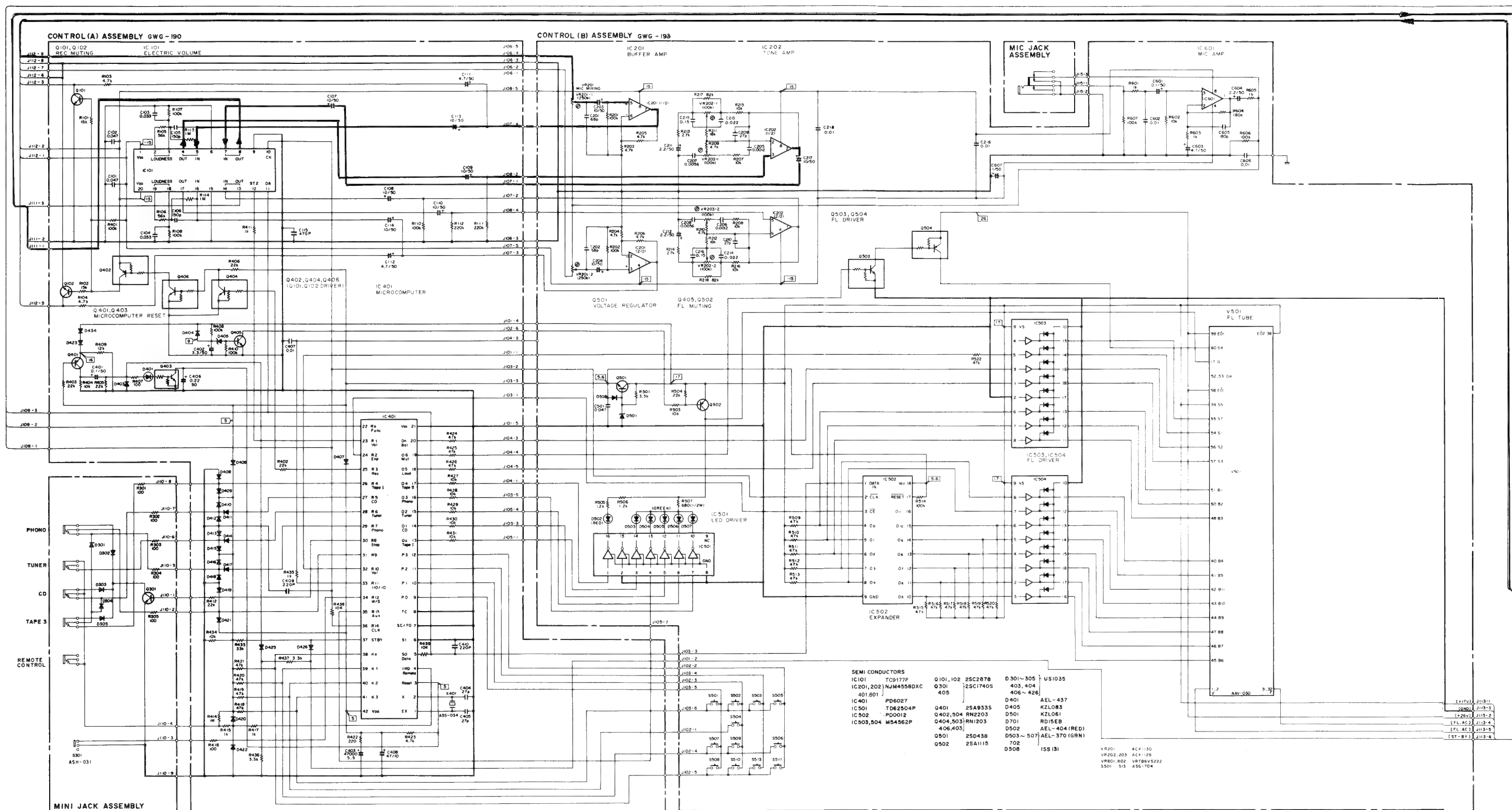
P.C. Board Pattern



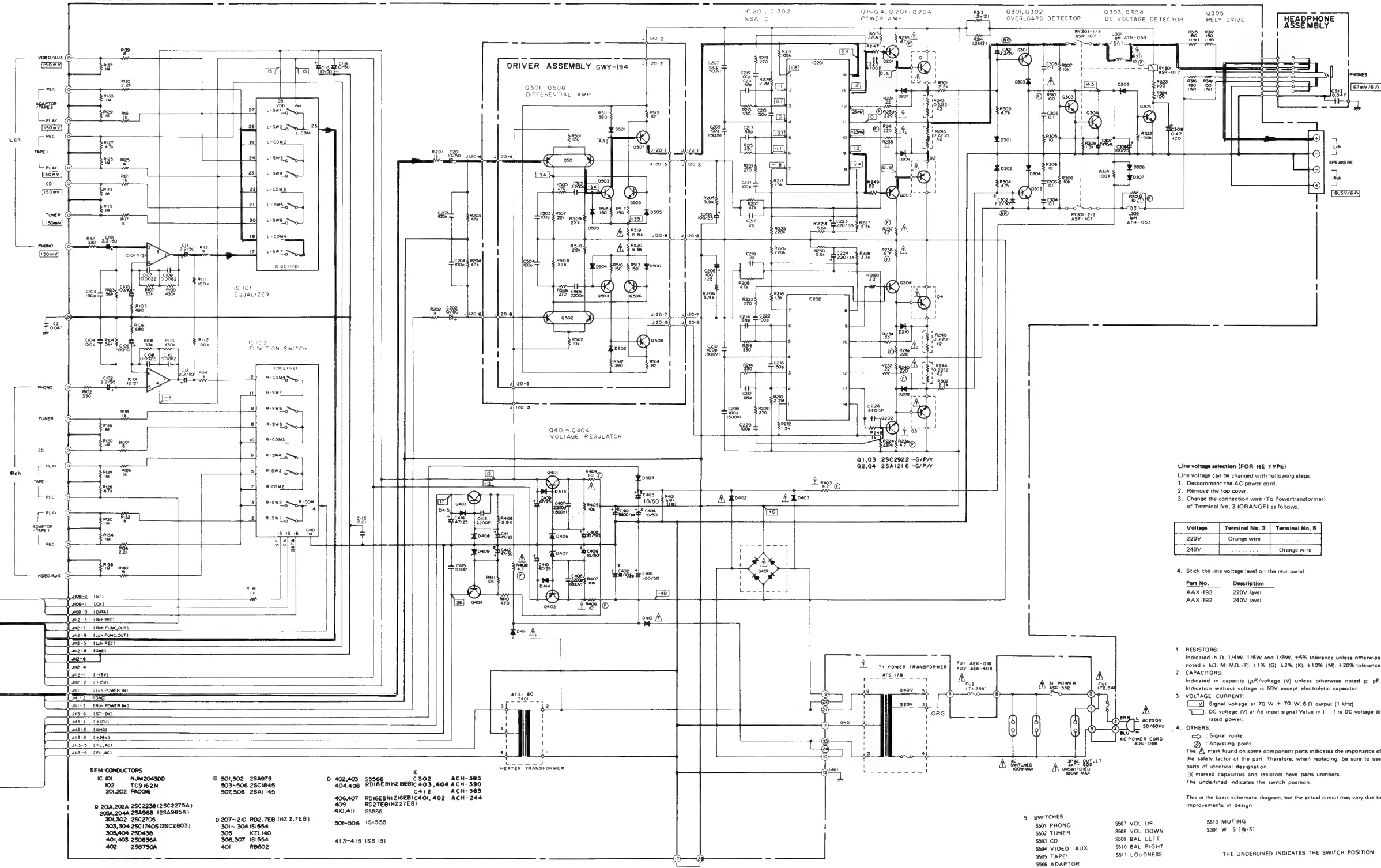
DRIVER ASSEMBLY
GWY-194

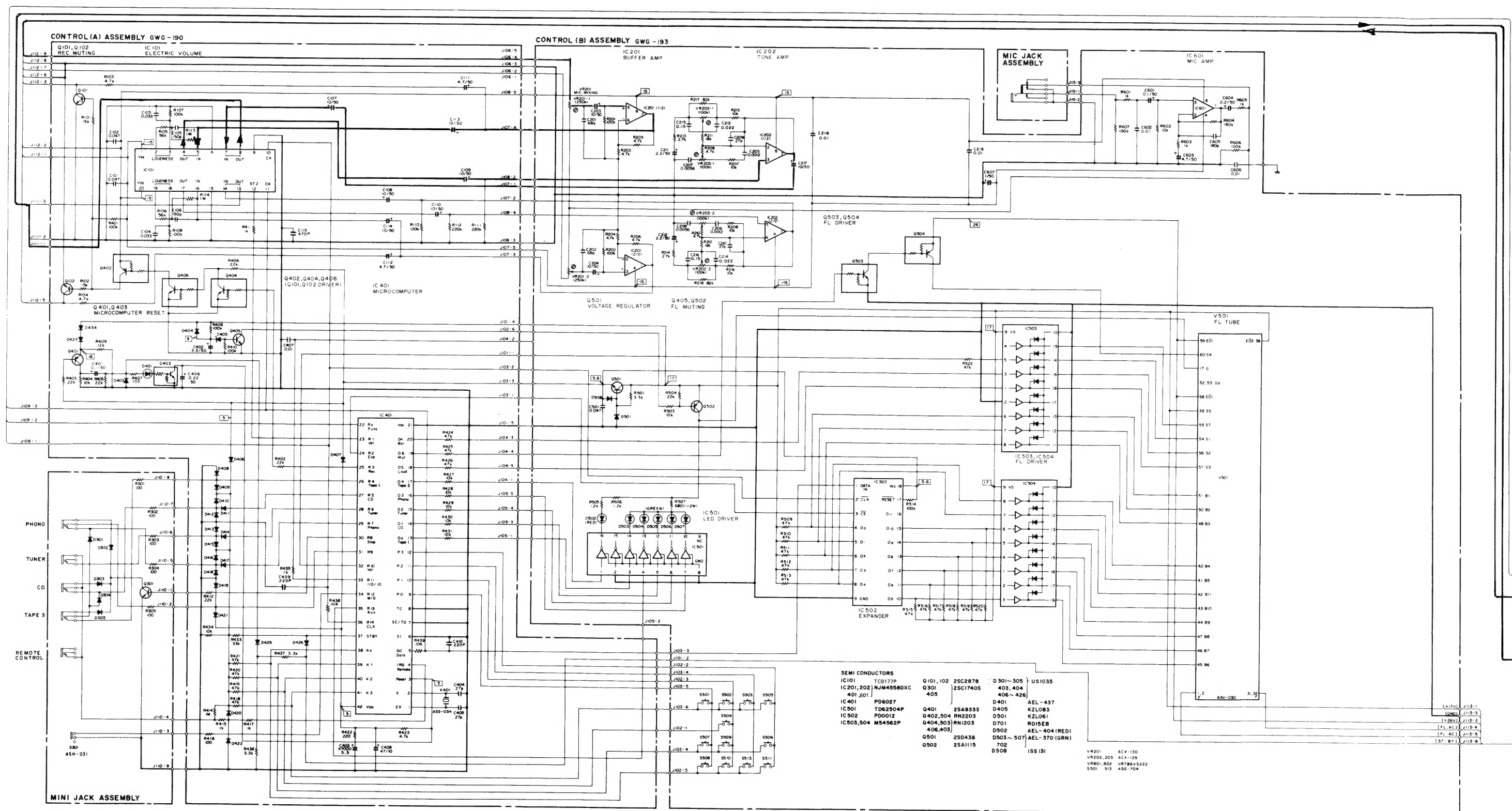


Schematic Diagram



A F ASSEMBLY GWK-251







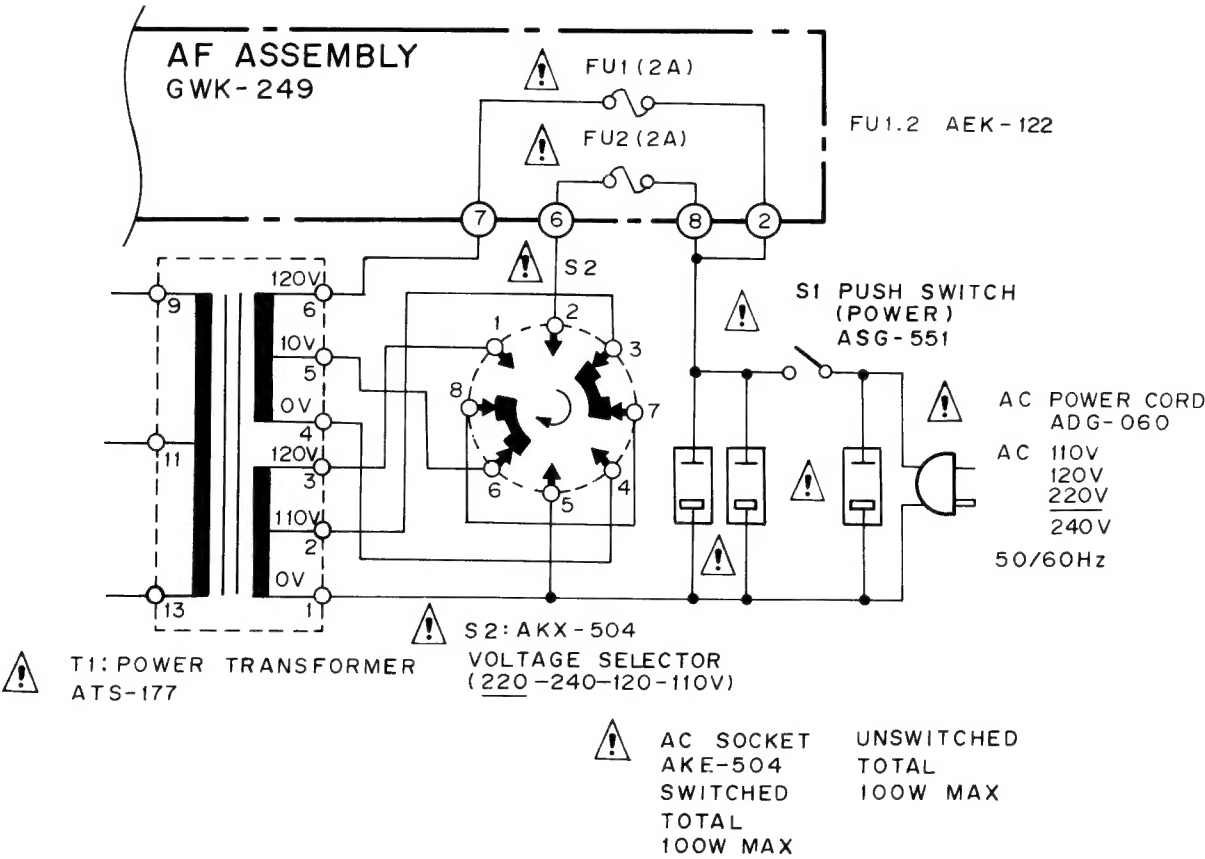
13. FOR S AND S/G TYPES

The S & S/G types are the same as the KU type with the exception of the following section.

Contrast of Miscellaneous Parts

| Mark | Symbol & Description | Part No. | | | Remarks |
|------|--------------------------------|----------|--------------|--------------|---------|
| | | KU type | S type | S/G type | |
| ⚠ ★ | T1 Power transformer (120V) | ATS-176 | ..... | ..... |  |
| | (110V, 120V, 220V, 240V) | ..... | ATS-177 | ATS-177 | |
| ⚠ ★★ | FU1 (4A) | AEK-125 | ..... | ..... |  |
| | (2A) | ..... | AEK-122 | AEK-122 | |
| ⚠ ★★ | FU2 (2A) | ..... | AEK-122 | AEK-122 | |
| ⚠ ★★ | S2 Line voltage selector | ..... | AKX-504 | AKX-504 | |
| ⚠ ★★ | AC power cord | ADG-088 | ADG-060 | ADG-060 | |
| | Screw | ..... | VTZ30P100FZK | VTZ30P100FZK | |
| | Sub instructions | ARH-070 | ARH-074 | ARH-074 | |

Schematic Diagram



14. FOR HB TYPE

The HB type is the same as the KU type with the exception of the following sections.

Contrast of Miscellaneous Parts

| Mark | Symbol & Description | Part No. | | Remarks |
|------|-----------------------------|-------------------|-----------|---------|
| | | KU type | HB type | |
| | AF assembly | GWK-249 | GWK-252 | |
| | Driver assembly | GWY-156 | GWY-194 | |
| ⚠ ★★ | Q2, Q4 | 2SA1216-G/P/Y | 2SA1216-G | |
| ⚠ ★★ | Q1, Q3 | 2SC2922-G/P/Y | 2SC2922-G | |
| ⚠ ★ | T1 Power transformer (120V) | ATS-176 | ..... |  |
| | (240V) | ..... | ATS-178 | |
| ⚠ | AC socket | AKP-504 | AKP-505 | |
| ⚠ ★★ | S1 Push switch (POWER) | ASG-551 (ASG-549) | ASG-552 | |
| ⚠ ★★ | FU1 (4A) | AEK-125 | ..... |  |
| | (T2.5A) | ..... | AEK-018 | |
| ⚠ ★★ | FU2 (T1.25A) | ..... | AEK-403 | |
| ⚠ | Power cord | ADG-088 | ADG-063 | |

AF assembly

The AF assembly (GWK-252) is the same as the GWK-249 with the exception of the following sections.

| Mark | Symbol & Description | Part No. | | Remarks |
|------|-------------------------|---------------|---------------|---------|
| | | GWK-249 | GWK-252 | |
| ★★ | Q201, Q202 | 2SC2238 | 2SC2235 | |
| ★★ | Q203, Q204 | 2SA968 | 2SA965 (A) | |
| ★ | D201 - D204 | KZL056 | ..... |  |
| ★ | D404 | RD22EB | RD18EB | |
| ★ | D413 - D415 | ..... | 1SS131 | |
| | C225, C226 | ..... | CQMA472K50 | |
| | C302 | CEANP2R2M50 | ACH-383 | |
| | C403, C404 | CEA100M50L | ACH-390 | |
| | C412 | CEA470M50L | ACH-385 | |
| | R247 | ..... | RD1/4PM102J | |
| | R248 | ..... | RD1/8PM102J | |
| | R249, R250 | ..... | RD1/8PM220J | |
| | R313, R314 | RS1PMF182J | RS2LMF122J | |
| | R319 | RD1/8PM124J | RD1/8PM104J | |
| | R323, R324 | ..... | RD1/8PM101J | |
| | R404, R406 | RD1/4PMFL270J | RD1/4PMFL100J | |
| | R408 | RD1/4PMFL4R7J | RFA1/4PS4R7J | |
| | R410 | RFA1/4PS100J | RD1/4PM471J | |
| | R412 | RD1/8PM220J | ..... |  |
| ⚠ ★ | T401 Heater transformer | ATS-141 | ATS-180 | |

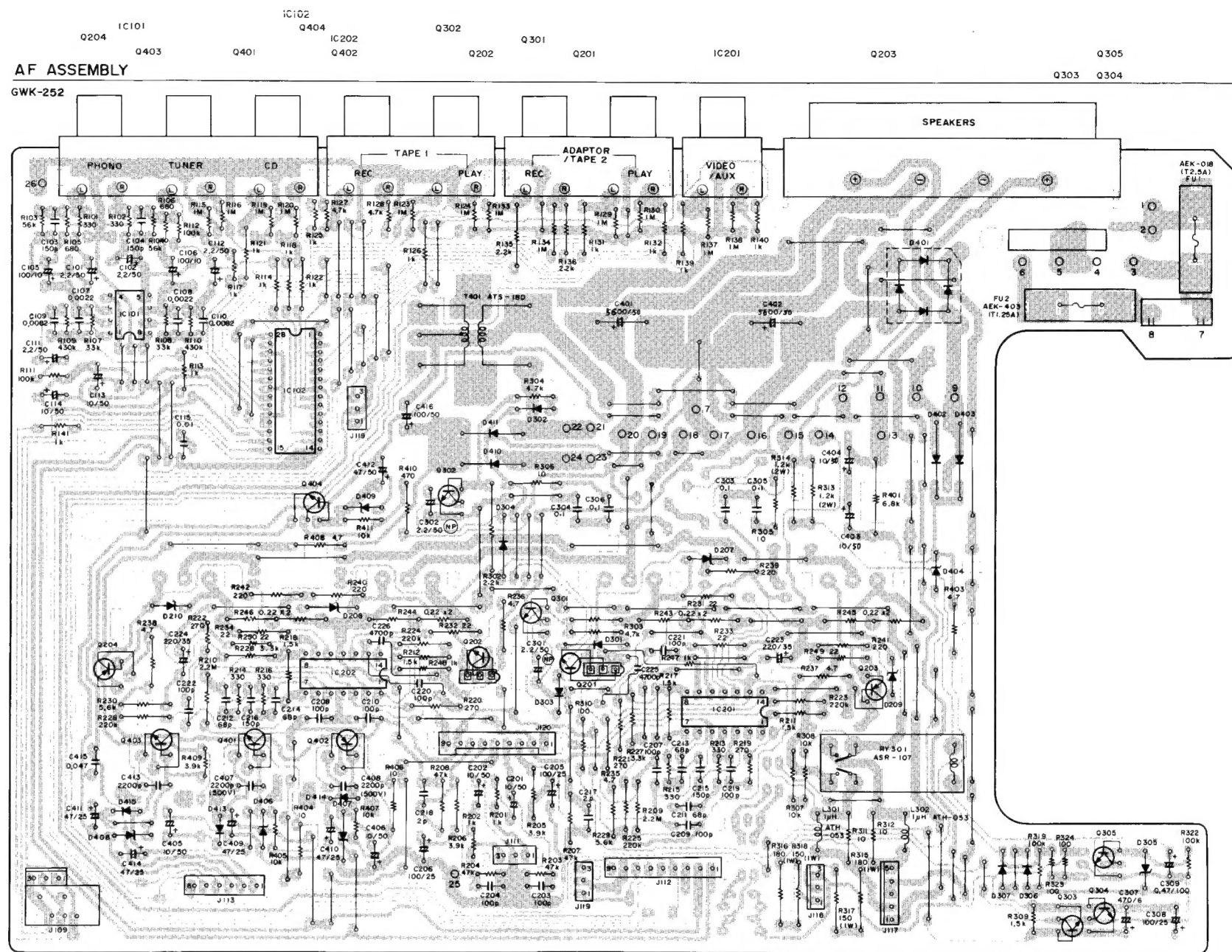
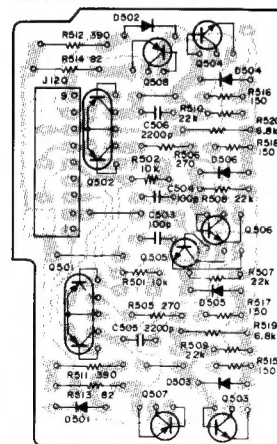
Driver assembly (GWY-194)

The driver assembly (GWY-194) is the same as the GWY-156 with the exception of the following sections.

| Mark | Symbol & Description | Part No. | | Remarks |
|------|----------------------|---------------|--------------|---------|
| | | GWY-156 | GWY-194 | |
| ⚠ | R507 - R510 | RD1/8PM 153J | RD1/8PM 223J | |
| | R519, R520 | RD1/4PMFL272J | RS2LMF682J | |
| | R511, R512 | RFA1/4PS271J | RD1/4PM391J | |
| | R513, R514 | RFA1/4PS820J | RD1/4PM820J | |

Q501, 502 : 2SA979
Q503 ~ 506 : 2SC1845
Q507, 508 : 2SA1145
D501 ~ 506 : US1035

P.C. Board Pattern

DRIVER ASSEMBLY
GWY-194

Q501, 502 : 2SA979
Q503 ~ 506 : 2SC1845
Q507, 508 : 2SA1145

D501 ~ 506 : US1Q35

Q201A, 202A : 2SC2235
Q203A, 204A : 2SA965
Q301, 302 : 2SC2705
Q303, 304 : 2SC1740S (2SC2603)
Q305 : 2SD438 (A)
Q401, 403 : 2SD836 A
Q402 : 2SB750 A
Q404 : 2SD438
IC101 : NJM2043DD
IC102 : TC9162N
IC201, 202 : PA0016
D207 ~ 210, : RD27EB
D301 ~ 304, 306, 307 : IS1554
D305 : KZL140
D401 : RB602
D402, 403 : S5566
D404 : RD18EB
D406, 407 : RD16EB
D409 : RD27EB
D410, 411 : S5566
D413 ~ 415 : IS5131